Unmanned Aerial Vehicles

Vertical Tactical Unmanned Aerial Vehicle (VTUAV)/Model 379/

Mission: Tactical Intelligence, Surveillance and Reconnaissance (ISR)

Nation/Service(s): United States/U.S. Navy & Marines

Manufacturer: Northrop Grumman Ryan Aeronautical Center, United States

Status: Contract Award 2/9/00
Scheduled IOC: USMC Q4 FY03 / USN Q3 FY 05

No. in Service: 0

History: In an effort to identify a replacement for the fixed-wing Pioneer UAV system and in the wake of withdrawal from the Outrider TUAV program, the Navy sought to exploit advances in VTOL technology to address requirements for Reconnaissance, Surveillance, Tracking and Acquisition (RSTA). The Navy's approach was to conduct a two-phased effort to identify VTOL technology and a potential successor to Pioneer's system capabilities.

The first phase, was a land-based demonstration of VTOL technology, held in Mar-May 98 at Yuma Proving Grounds. This phase evaluated the technical maturity of three approaches to VTOL flight: Tiltrotor technology (Bell Textron's Eagle Eye), Counter-rotating rotor technology (Bombardier's Guardian CL-327), and a conventional helicopter approach, (SAIC's Vigilante). The second phase, involved contract options awarded to both Bombardier and Bell based on the maturity demonstrated in phase one. The goal of this demonstration was to integrate the UAV, Common Automatic Recovery System (UCARS) for both land-based and sea-based testing.

Separate from the VTOL demonstration effort the Navy initiated its acquisition strategy with a RFP for a VTUAV capability. Through a Direct Down source selection process, the Navy awarded the VTUAV contract to Northrop Grumman Ryan in Feb 00. Initial Operational capability is scheduled for 2004 and eventual procurement of 23 systems is anticipated, 12 for the Navy and 11 for the Marines.

Each system is comprised of 3 air vehicles with multi-mission payloads (MMP), UCARS, GCS (TCS compliant), and a Remote Data Terminal (RDT).

Description: The VTUAV system provides commanders with real time imagery, both Electro-Optical (EO) and Infra Red (IR) from a multi-mission payload that includes laser designation capability. The air vehicle (AV), Ryan Model 379 is powered by a single Allison Rolls-Royce 250-C20W, heavy fuel, turbo-shaft engine and is based on the man-rated Hughes/Schweizer 269 series helicopter. It carries a Multi-Mission Payload (MMP) to include EO/IR/Laser designator sensor in a gimbaled turret.

Each Marine VTUAV system will consist of:

3) AVs with MMPs,.
2) Ground Control Station (GCS) in an S-788 shelter

2) HMMWVs per system
?) Trailers
2) Generators
1) UCARS (embarked)
Ashore operations will use differential GPS
2) RDT
?) Personnel

In order to transport an USMC system TBD HMMWVs and TBD trailers are required. The system can be airlifted in TBD C-130 sorties.

Each Navy VTUAV system will consist of:

3) Avs with MMPs
1) GCS (TCS compliant and integrated into Q-70 workstations on AEGIS combatants)
Note: A USN land based GCS will be configured in a S-280 shelter.
1) UCARS
1) RDT

Fielding Plan:

Table 1. Fielding Plan

• 12 Navy Systems	• 11 Marine Corps Systems
- 36 Air Vehicles	- 33 Air Vehicles
- 24 GCS	- 22 GCS
• Plan	• Plan
- 18 Air Vehicles, 2 land GCS, 4 Ship GCS (DD) to LANTFLT	- 12 Air Vehicles, 8 Land GCS to VMU-1
- 18 Air Vehicles, 2 Land GCS, 4 Ship GCS (DD) to PACFLT	- 12 Air Vehicles, 8 Land GCS to VMU-2
- 12 GCS to LHA/LHD	- 9 Air Vehicles, 6 Land GCS to MPF

Operations: In Navy use, the VTUAV system will be deployed aboard and be capable of operating from air capable cruisers and destroyers (DD/DDG/CG). For Marine operations, both Unmanned Aerial Vehicle squadrons (VMU-1 and –2) will be assigned four systems each, which will deploy in single system detachments with Marine Expeditionary Units (MEUs) aboard LHA/LHD and LPD-17 class large deck amphibious ships. In addition, three systems will be stored afloat in Maritime Prepositioning Ships.

Specifications.

Table 2. Aircraft Characteristics and Performance.

Length, (Folded) ft:	22ft11in	Wingspan, ft:	27ft 6in (rotor dia)

Gross Weight, lbs:	2550	Payload Weight, lbs:	200
Fuel Capacity, lbs:	848 (130.5 gal)	Fuel Type:	Heavy Fuel
Engine(s): One Allison Rolls Royce 250-C20W turboshaft		Power, SHP:	420
Endurance, hrs:	6+	Radius, nm:	110
Speed, kts:	0 (loiter)/125 +(dash)	Ceiling, ft:	20,000
Takeoff Means:	Hover	Landing Means:	Hover
Runway Required, ft:	n/a	Crosswind Limit, kts:	25

Table 3. Sensor Characteristics and Performance.

(Note: Subcontract not yet finalized – Provided information should be considered DRAFT)

Type	EO	IR	LD/LRF
Supplier	NGC-ESSS		
Aperture	4	6	2.3
Field of Regard, [deg]	360 Az, +15/-105 El		
Field of View, [deg]	Zoom lens from 0.36h x 0.27v to 13.6 x10.2v	NFOV 0.73h MFOV 2.9h WFOV 13.5h	
Array size, [pixels]	756 x 480	256 x 256	
Frequency, [um]	0.4 – 0.8	3 – 5	1.06
Resolution	ID @ 11.5 [km]	ID @ 6.6 [km]	
Detector Material	Color CCD	InSb w/ dither	
Mounting	Gimbaled turret		
Total Weight, [lbs]	110		
Turret	71		
Electronics, etc.	39		

Table 4. VTUAV & Hawklink Data Link Characteristics and Performance.

Use:	**Command**	**Telemetry**	**Video**
Type:	**LOS uplink**	**LOS downlink**	**LOS downlink**
Frequency, GHz:	15.15 to 15.35	14.53 to 14.93	14.53 to 14.93.
Backup, MHz:	100 to 400	100 to 400	N/A
Bandwidth, MHz:	3 MHz	3 MHz	18 MHz (total=22MHz)
Tunability, kHz:	5 MHz Steps	5 MHz Steps	5 MHz Steps
Antenna:	3 ft. dia. Dish with Omni	Sweetspot Ant. with 3dB omni	Sweetspot Ant. with 3dB omni

Data Rate:	200 Kbps	Up to 1.5 Mbps	4.5 to 9.0 Mbps
Encryption:	KGV-68B	KGV-68B	KGV-68B
Weight, lbs:	GDT=270 lbs	ADT=55 lbs (with antenna)	ADT=55 lbs

Future Development. TBD

Program Schedule: TBD

Operational Units:
None

Management:

Program Element: Navy

Service POC: N753
Pentagon, Washington, DC
DSN: 227-1466
Comm: (703) 697-1466

Program POC: PMA-263
NAS Patuxent River, MD
DSN: 342-5304
Comm: (301) 757-5304